Supported by:
Federal Ministry for Economic Affairs and Energy
on the basis of a decision by the German Bundestag

The SolSteam Project

funded by the German federal ministry of economic affairs and Energy

Lisa Willwerth

DLR

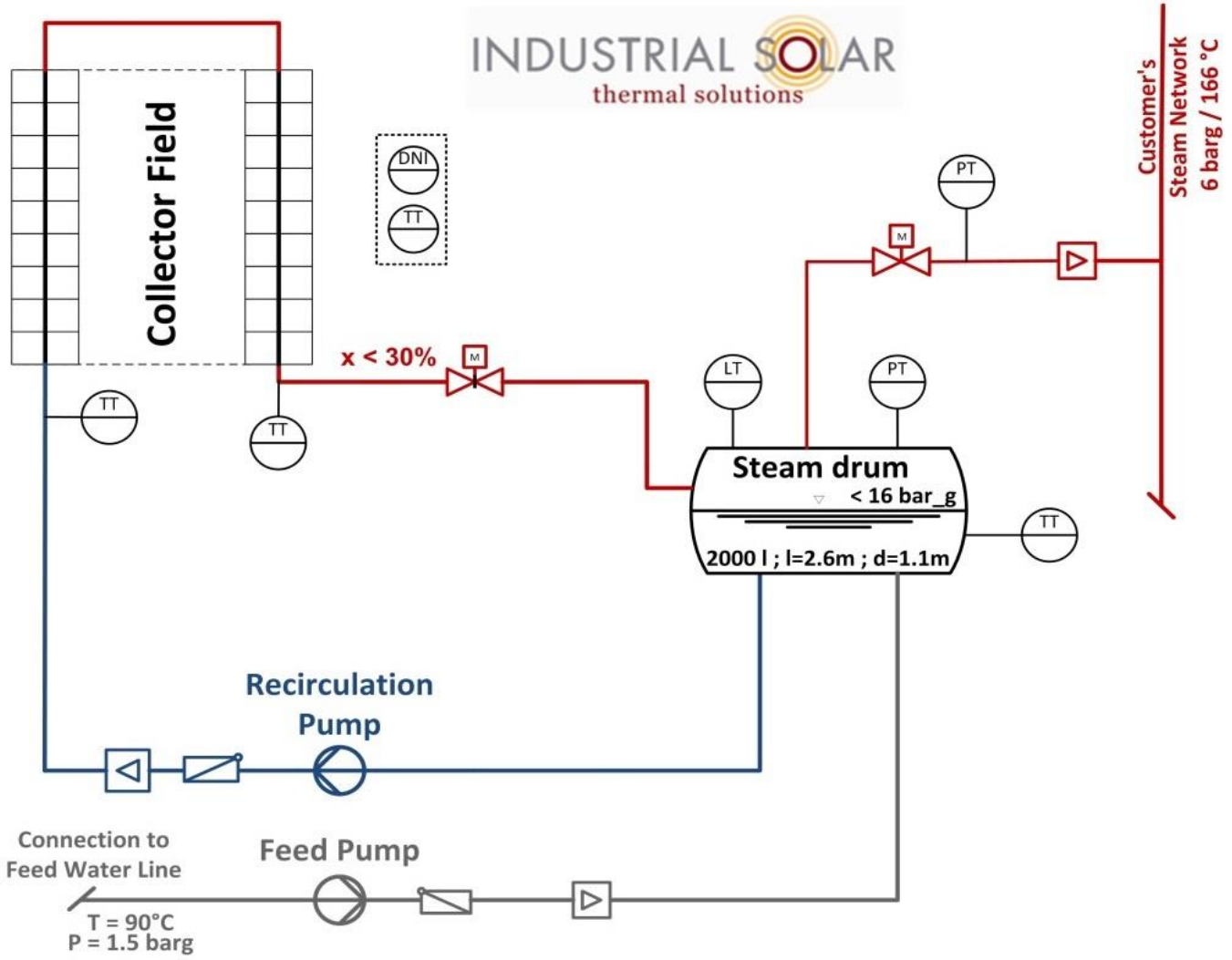
INDUSTRIAL SOLAR
renewables onsite

Solar Field at RAM Pharma, Amman

- Solar field: linear Fresnel collectors of Industrial Solar GmbH
- Supply of saturated steam at 6 bar gauge
- Start of operation: March 2015

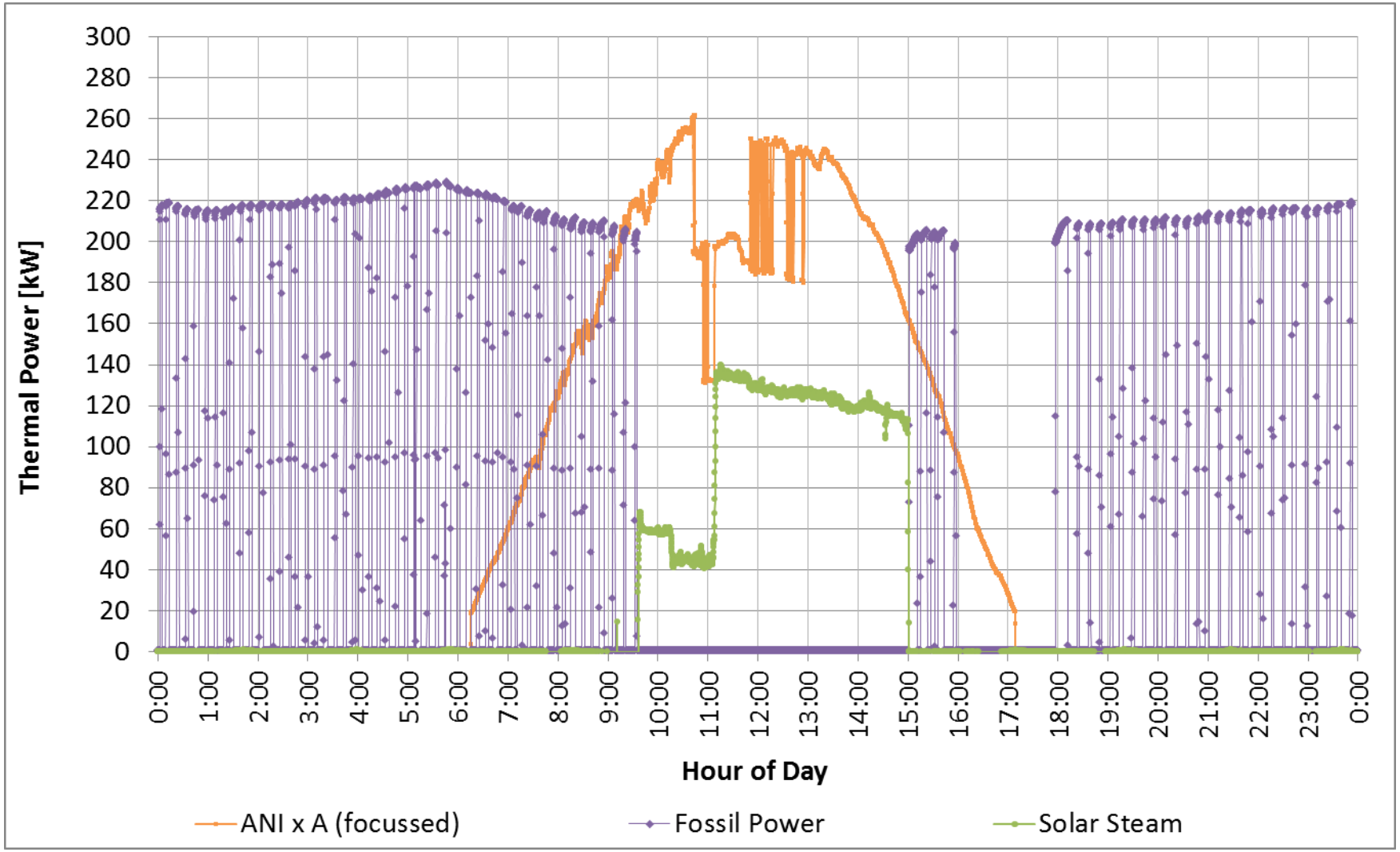
Collector field and steam drum with piping to steam network

Solar Field at RAMPharma, Amman



General design, SD only

Experience of Operation with SD



7th of April 2015

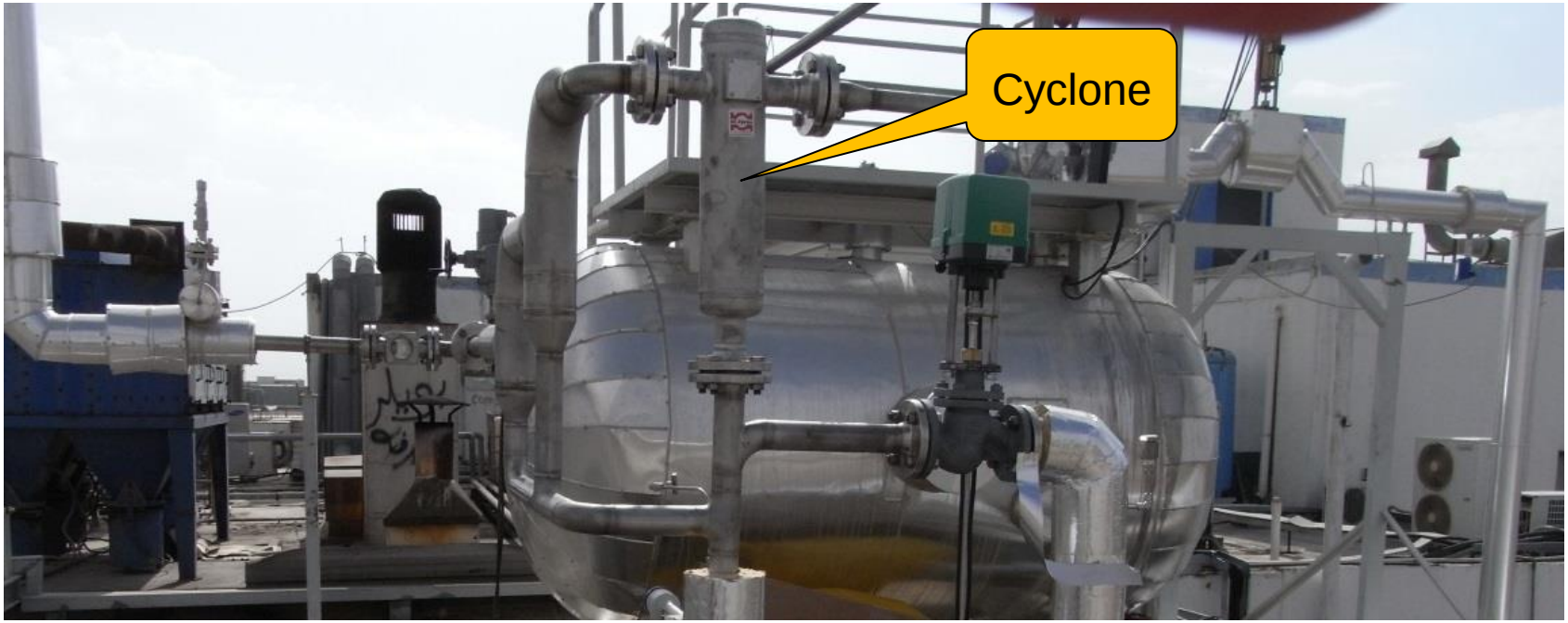
Experience of Operation with SD

- Reliable operation
- No negative interference with conventional steam supply
- Solar steam supply often higher than demand
- SD function as Ruth storage works well by supplying steam in a pressure range from 7 bar_g to 14 bar_g

Topics of the SolSteam project

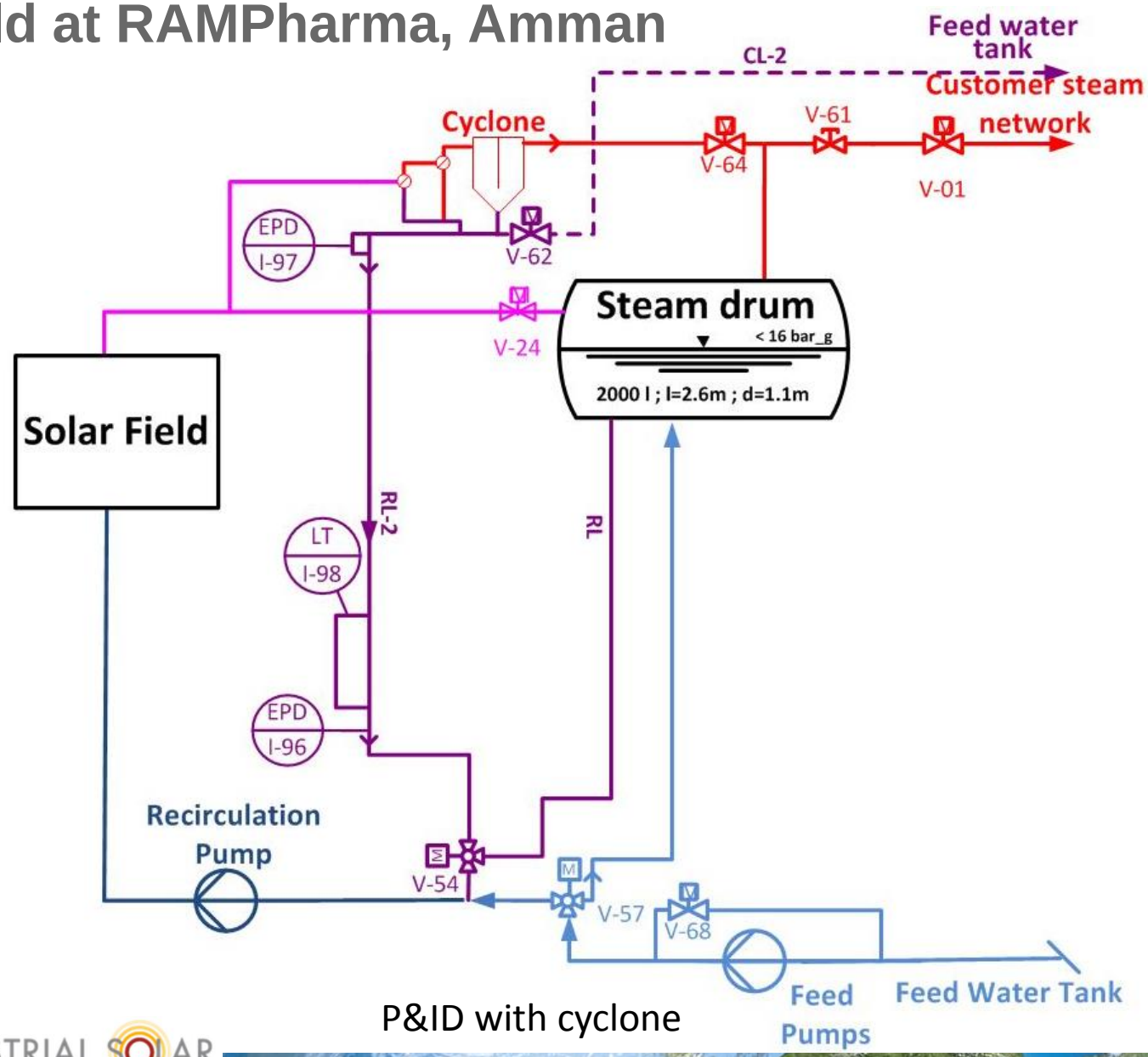
- Stability of operation
- Performance test
- Testing and improving layout and control
  - Alternative parameters for control
  - Alternative separator
- Safety test
- Water quality
- Etc.

Cyclone at RAMPharma, Amman



- SolSteam project: test of alternative separator
- Motivation: save investment costs

Solar Field at RAMPharma, Amman



P&ID with cyclone

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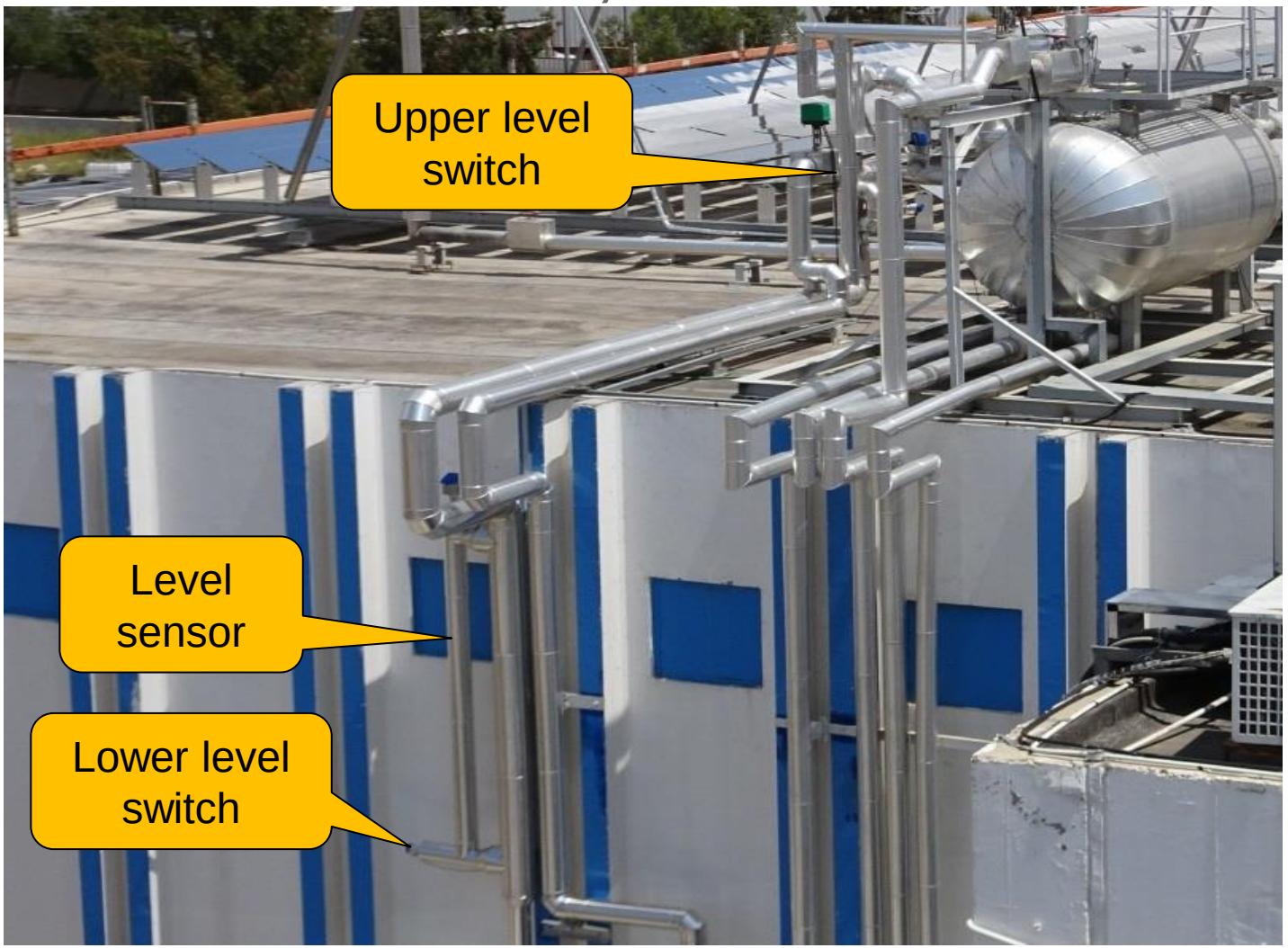
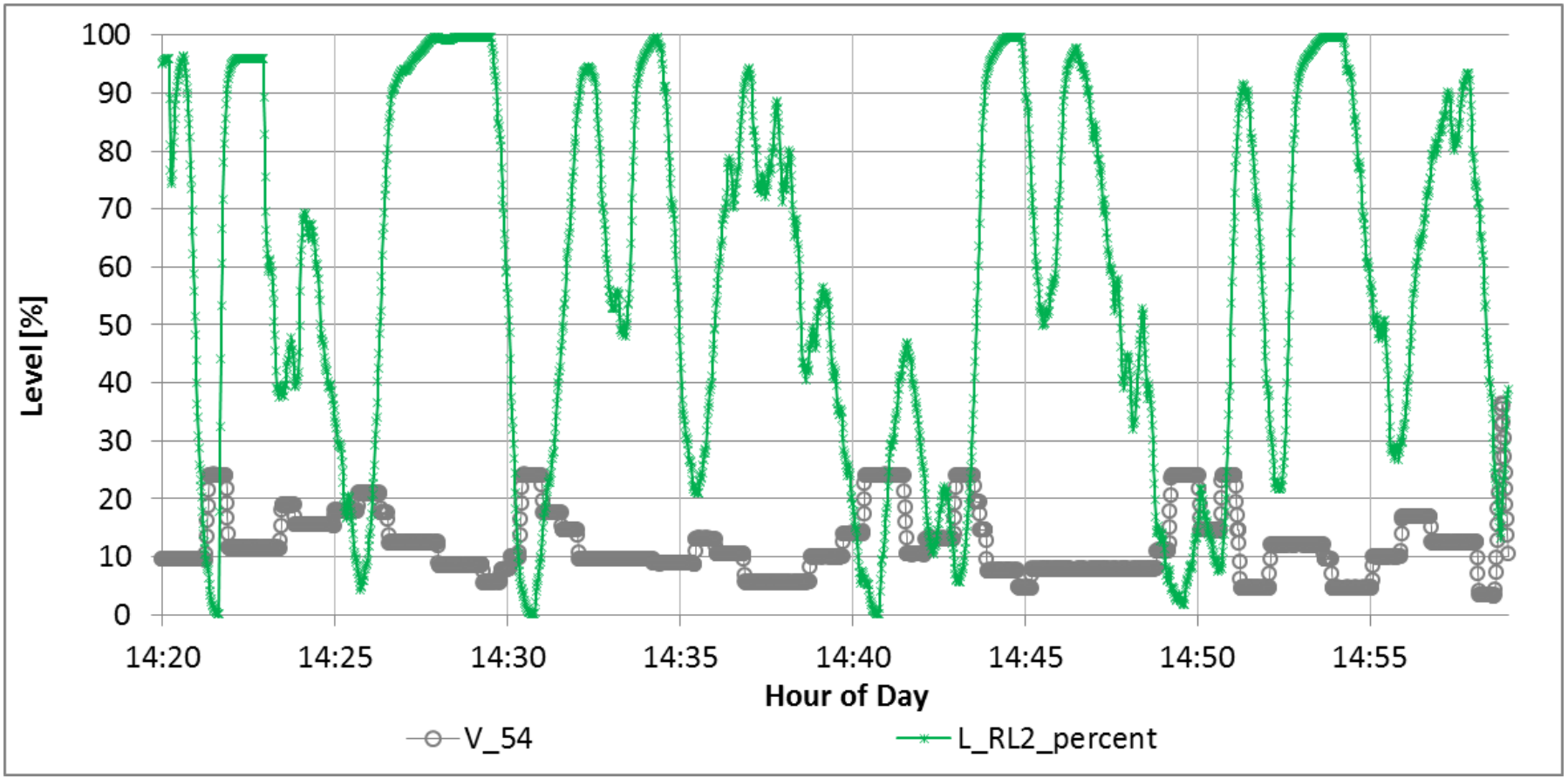
Solar field at RAMPharma, Amman



Instrumentation to control the water level in the piping below the cyclone

Solar field at RAMPharma, Amman



Manual control of condensate level during cyclone operation

Conclusions

Extensive amount of data collected and analyzed

Operation along cyclone:

- Works with rapid automatic control
- Allows faster start up
- No storage

Operation along steam drum:

- Works well
- Stabilizes operation
  - Solar steam supply constant even at strong variations in demand
  - Storage function for clouds and evening operation